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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,943	11/07/2003	Wayne F. Block	GEMS8081.186	2942

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EXAMINER	
KIKNADZE, IRAKLI	

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 02/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/605,943	BLOCK ET AL.	
	Examiner	Art Unit	
	Irakli Kiknadze	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication:
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 February 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 2, 2006 has been entered.

Claim Objections

2. Claim 34 objected to because of the following informalities: Claim 34 is awkward. It is presented, as an independent claim but seems that it should depends on claims 32 or 33. For examination purposes examiner assumed that claim 34 depends on claim 32. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 32-34 are rejected under 35 U.S.C. 102(b) as being anticipated by Silbermann (US Patent 2,942,126).

With respect to claim 32, Silbermann teaches an anode disc assembly comprising:

a support having a beveled edge;

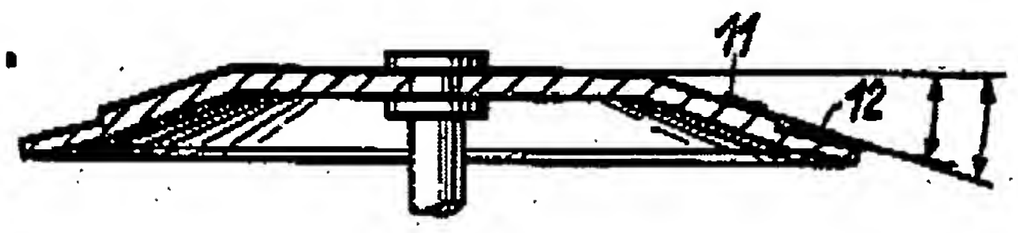

Fig.3

a first x-ray source disposed on the beveled edge that emits a first x-ray fan beam from a first target (12);

a second x-ray source disposed on the beveled edge that emits a second x-ray fan beam from a second target (11); and

wherein the first x-ray fan beam has a projection path that is enveloped in a z-direction by that of the second x-ray fan beam (Fig.3; column 4, lines 25-33).

With respect to claim 33, Silbermann teaches the first x-ray source includes a first target electrode ring (12) and the second x-ray source includes a second target electrode ring (11), and wherein the first target electrode ring has a radius greater than that of the second target electrode ring (see Fig.3).

With respect to claim 34, Silbermann shows that the second x-ray fan beam is partially blocked by the support before reaching a sunken plate edge (see Fig.3).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 2, 7-12 and 15 are rejected under unpatentable over Knott (US Patent 5,511,105).

With respect to claim 1, Knott teaches an anode assembly comprising: an anode disc (10); a first x-ray source (BFB1a) connected to the anode disc (10) and configured to emit a first fan beam of x-rays; a second x-ray source (BFB1b) connected to the anode disc and configured to emit a second fan beam of x-rays;

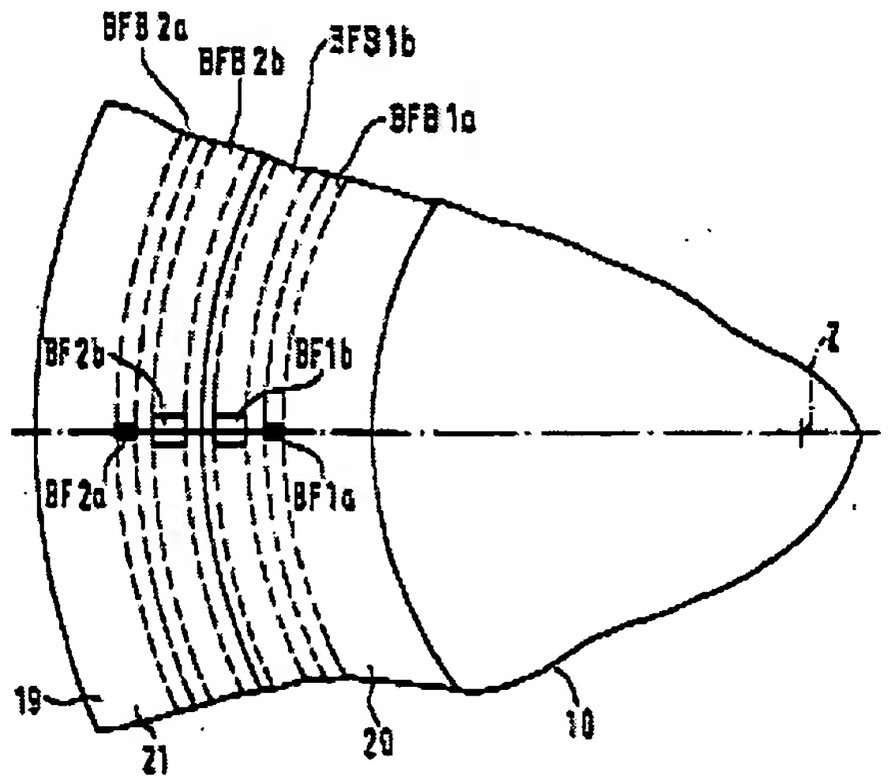

FIG 3

wherein the first x-ray source has a

distance from a center of the anode disc (10) different than that of the second x-ray source: and wherein the first x-ray source and the second x-ray source are configured to extend radially about the anode disc (Figs. 1 and 3; column 3, lines 13-41; claim 2). Knott is silent about the second fan beam having a spatial coverage equal to that of the first fan beam. The first and second target electrodes (BF1a) and (BF2a) as well the another combination of first and second target electrodes (BF1b) and (BF2b) have substantially the similar electrode bombardment areas (focal spots) (Fig.3). The electrons emanating from the respective incandescent cathodes (5a, 5b, 6a and 6b) impinge the respective areas (focal spots) at the same angle (Fig.1). The anode disk (10) has a constant face angle relative to the cathodes. It would have been obvious to one of ordinary skill in the art at the time the invention was made that in the X-ray tube assembly of Knott the respective incandescent cathodes (5a, 5b, 6a and 6b) impinging the respective focal spots having the substantially same areas at the same angle would provide the X-ray fan beams having the equal spatial coverage.

With respect to claim 2, Knott teaches that the anode disc (10) is rotatable (Figs. 1 and 3; column 2, lines 31-40; claim 2).

With respect to claim 7, Knott teaches that the each fan beam has penumbra that extends along a z-axis (Fig.3; see abstract; column 3, line – column 4, line 8).

With respect to claim 8, Knott teaches that each x-ray source includes a tungsten target track integrally formed in a bevel region of the anode disc (10) (column 3, lines 42-47).

With respect to claims 9 and 10, Knott teaches an x-ray tube assembly (1) comprising: a plurality of independently controllable electron sources (5a, 5b, 6a and 6b are controlled by a control unit (22)) configured to emit electrons; an rotating anode disc (10); a plurality of target electrodes (BFB2a, BFB2b, BFB1b and BFB1a) disposed on the anode disc (10) and configured to receive electrons emitted by the plurality of independently controllable electron sources and emit a plurality of fan beams of x-ray energy in response thereto; and wherein the plurality of independently controllable electron sources includes a first target electrode (BF1a or BF1b) at a first radial distance from a center of the anode disc (10) to produce a first spatial coverage and a second target electrode (BF2b or BF2a) at a second radial distance to produce a second spatial coverage (Figs. 1 and 3; column 3, lines 13-41; claim 2). Knott is silent about the second spatial coverage being substantially similar to the first spatial coverage. The first and second target electrodes (BF1a) and (BF2a) as well the another combination of first and second target electrodes (BF1b) and (BF2b) have a substantially same the electrode bombardment areas (focal spots) (Fig.3). The electrons emanating from the respective incandescent cathodes (5a, 5b, 6a and 6b) impinge the respective areas (focal spots) at the same angle (Fig.1). The anode disk (10) has a constant face angle relative to the cathodes. It would have been obvious to one of ordinary skill in the art at the time the invention was made that in the X-ray tube assembly of Knott the respective incandescent cathodes (5a, 5b, 6a and 6b) impinging the respective focal spots having the substantially same areas at the same angle would provide the X-ray fan beams having the similar spatial coverage.

With respect to claims 11 and 12, Knott teaches that each fan beam extends along a z-axis (Fig.3). A plurality of tungsten targets integrated in a beveled portion of the anode disc (10) (column 3, lines 42-47).

With respect to claims 15, Knott teaches the electron sources includes a pair of cathode filaments and wherein the pair of cathode filaments is configured to alternately fire during an imaging scan (Fig.1; column 4, lines 21-34).

7. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knott (US Patent 5,511,105).

With respect to claims 13 and 14, Knott teaches that the focal spots located on the conical anode disc (10) are spaced apart from one another along a z-direction and an x-direction (see abstract and Figs.1 and 3) but fail to teach that the focal spots are spaced apart from one another along a z-direction by approximately one millimeter. It would have been obvious to one of ordinary skill in the art at the time the invention was made to position the focal spots spaced apart from one another along a z-direction in the range of approximately one millimeter, since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or working range involves only routine skill in the art.

8. Claims 4-6, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sohval et al. (US Patent 4,637,040) in view of Knott (US Patent 5,511,105).

With respect to claims 4, 16 and 17, Sohval teaches a CT system comprising: a

rotatable gantry (6) having a bore centrally disposed therein; a table movable fore and aft through the bore and configured to position a subject (5) for CT data acquisition; a detector array (3) disposed within the rotatable gantry (6) and configured to x-ray energy attenuated by the subject (5); an anode disc (19) positioned within the rotatable gantry (6); multiple x-ray sources configured to project magnetic energy fan beams toward the subject (5); wherein each projection source is configured to operate at a proportional duty cycle per scan (column 8, lines 4-27; column 9, line 32-60; column 5, lines 25-39). Sohval fails to teach that the x-ray sources extending circumferentially about the anode disc (19). Knott teaches an x-ray tube comprising a first x-ray source (BFB1a) connected to an anode disc (10) and configured to emit a first fan beam of x-rays; a second x-ray source (BFB2b) connected to the anode disc and configured to emit a second fan beam of x-rays; wherein the first x-ray source has a distance from a center of the anode disc (10) different than that of the second x-ray source: and wherein the first x-ray source and the second x-ray source are configures to extend circumferentially about the anode disc (Figs. 1 and 3; column 3, lines 13-41; claim 2). The incandescent cathodes (5a, 5b, 6a and 6b) bombarding the respective focal spots having the substantially same areas at the same angle providing the x-ray fan beams having the equal spatial coverage. Knott teaches generating the x-rays of the different hardness (column 3, lines 43-60) from focal spots having plurality of different size and/or positions (column 4, lines 40-48). It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the x-ray tube of Knott in the system of Sohval, since such a modification would improve the CT system

with dual energy scanning capabilities generating x-rays from focal spots having plurality of different size and /or positions.

With respect to claim 5, Knott teaches that the first and second x-ray sources are positioned relative to one another on the anode disc such that the first: and the second x-ray sources may be treated as a single focal point source (see abstract).

With respect to claim 6, Sohval teaches that the multiple high frequency electromagnetic energy projection sources include a first source (9) and a second source (11) and wherein the first and the second source each operate at a 50% duty cycle per scan (column 5, lines 37-39).

9. Claims 25-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sohval et al. (US Patent 4,637,040) in view of Silbermann (US Patent 2,942,126).

With respect to claims 25 and 26, Sohval teaches a CT system comprising:

a rotatable gantry (6) having a bore centrally disposed therein;

a table movable fore and aft through the bore and configured to position a subject (5) for CT data acquisition;

a detector array (3) disposed within the rotatable gantry (6) and configured to detect x-ray energy attenuated by the subject (5);

an anode disc (19) positioned within the rotatable gantry (6);

multiple x-ray sources configured to project magnetic energy fan beams toward the subject (5); wherein each projection source is configured to operate at a proportional duty cycle per scan (column 8, lines 4-27; column 9, line 32-36; column 5, lines 37-39).

Sohval fails to teach that the x-ray sources extending circumferentially about the anode disc (19). Silberman teaches (Figs. 1 and 2) an x-ray tube comprising x-ray two energy projection sources extending circumferentially about the anode disc (1) and

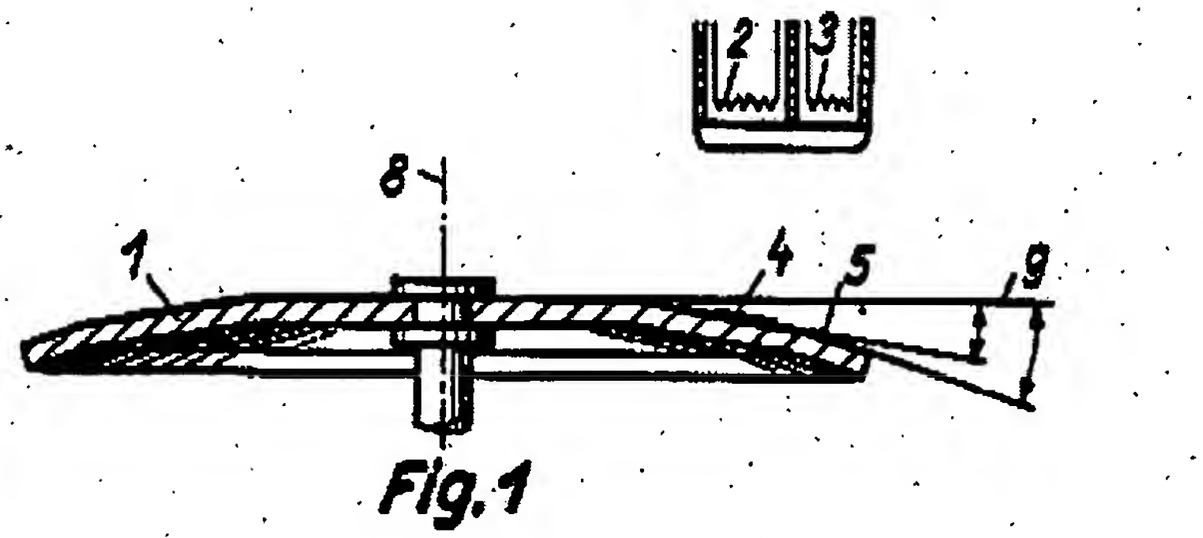

Fig.1

configured to project two x-ray energy fan beams, each fan beam emitted from a face of the anode disc (1) at an angle of projection; and wherein the fan beams have different angles of projection relative to one another (column 3, lines 6-26). An X-ray tube, according to the invention is especially suited for taking series of general radiographs with X-ray apparatus by using the outer target track, and also for taking detail radiographs of, much finer definition and a full overall exposure by using the inner target track (column 4, lines 8-14). Moreover, a tube according to the invention is superior to known types of tube with a single circumferentially extended target track because it has a longer life, since the deterioration of an X-ray tube is due to the gradual roughening of the surface of the track and the progressive vaporization of the hot cathode filament (column 4, lines 15-23). It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the x-ray tube comprising x-ray two energy projection sources extending circumferentially about the anode disc as suggested by Silbermann

in the apparatus of Sohval, since such a modification would extend the service time the x-ray tube and would improve the CT system with dual type scanning capabilities.

With respect to claim 27, Silberman shows that the fan beams have a similar spatial coverage along a z-direction (See Fig.3).

With respect to claim 28, Sohval teaches that the CT system includes a plurality of anodes and a plurality of cathodes, and further comprising a controller configured to sequentially fire each cathode before re-firing a respective cathode (column 9, lines 42-49).

With respect to claim 29, Sohval teaches the source arrangement wherein the number of anodes equals the number of cathodes (column 9, lines 32-40).

With respect to claim 29, Silbermann teaches the source arrangement wherein the number of anodes equals the number of cathodes (Figs. 1 and 4; column 3, lines 6-11).

With respect to claim 30, Sohval teaches a computer programmed to execute an image reconstruction process and wherein the electromagnetic energy projection sources are collectively considered a single high frequency electromagnetic energy projection source by the image reconstruction process (column 5, lines 59-66).

With respect to claim 31, Sohval teaches that the CT system is configured to non-invasively acquire diagnostic data of a medical patient (column 8, lines 14-17).

Response to Arguments

10. Applicant's arguments with respect to claims 1, 2, 4-17 and 25-34 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Irakli Kiknadze whose telephone number is 571-272-2493. The examiner can normally be reached on 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on 571-272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Irakli Kiknadze
February 13, 2006
IK

EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER